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ERASMUS AS A NATURALIST.

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THIS article on Erasmus as a naturalist is based on the following works :—

'In Praise of Folly,' Reeves and Turner's edition, 1876.

'The Colloquies,' Bailey's Translation, 1725.

'Enchiridion Militis Christiani' (1515).

Nisard's 'Etudes sur la Renaissance' (1855).

Seebohm's 'Oxford Reformers' (1869).

'Life and Letters of Erasmus' (Longmans & Co.), for the loan of a copy of which I have to thank a distinguished brother naturalist.

By Sir Thomas More: 'Utopia' (English version, 1556).

'History of King Richard III.' (1513).

'Life of Sir Thomas More,' by his Son-in-law, William Roper (Singer's rare edition, 1817).

Stapleton's 'Tres Thomæ' (Douai, 1588), and 'The Life and Writings of Sir Thomas More,' by the Rev. T. E. Bridget, S.J., (London: Burns & Oates, 1891).

It will be observed that I have included several of Sir Thomas More's works, and I should have liked to have dealt with these illustrious authors jointly, for it is nearly impossible to separate them in their lives and works, as true naturalists, as unrivalled scholars, humanists, satirists, reformers of gross abuses, and

mutually attached friends. That, however, would have extended this article to an inordinate length; and here I shall leave "Blessed Thomas More" with only one (but that a charming one) reference to that illustrious martyr as a genuine lover of a great variety of God's dumb creatures. It is from the pen of Erasmus himself, and forms part of a long letter (written in Latin, of course) to Ulrich von Hutten, a German noble, who had formed a very high opinion of More's genius from reading his 'Epigrams' and 'Utopia,' and was anxious to learn something about the personality of the author. The following is the passage pertinent to our subject (literal translation):—

"One of his great delights is to consider the forms, the habits, and the instincts of different kinds of animals. There is hardly a species of bird that he does not keep in his house, and rare animals, such as monkeys, foxes, ferrets, weasels, and the like. If he meets with anything foreign, or in any way remarkable, he eagerly buys it; so that his house is full of such things, and at every turn they attract the eye of visitors, and his own pleasure is renewed whenever he sees others pleased."

We have here a charming idea of More, and his writings bear ample testimony to the fidelity of the picture.

"NATURAL HISTORY" IN THE AGE OF ERASMUS.

The literature of this subject is ample enough, but it is more entertaining than instructive, and I only make passing reference to it for the purpose of illustrating, by way of contrast, the scientific standpoint of Erasmus as a field-naturalist, and a really great observer, investigator, and theoriser on the every-day aspects and phenomena of animal and plant life. Erasmus was, of course, thoroughly familiar with the 'De Anima' of Aristotle, the 'Historia Naturalis' of Pliny, and, indeed, with probably all extant writings of the ancients that dealt directly with natural history, or indirectly with it in works of travel and geography. He probably also knew Bartholomew's 'Liber de Proprietatibus,' &c. (1479), 'Hortus Sanitatis' (1490), and a few other contemporary works, mainly borrowed from Pliny ("As Pliny saith"), with a vast amount of mediæval myth, descriptions of rare monsters, &c., added in all simple earnestness and unbounded credulity. It was not in a Gallio spirit that "he cared for none of these



things"; he simply ignored them in his search after the truth as it is in nature, and some of his inductions came near the generalisation of facts as now accepted after more than five hundred years of observation, research, and even elaborate experimentation. For instance, we have had many books, *brochures*, magazine articles, &c., devoted to the subject of "animal instinct *v.* reason," and I would mention such standard works as 'Animal Behaviour' and 'Habit and Instinct,' by Principal Lloyd Morgan. It is now generally admitted that there is no definite dividing line between what is called "animal instinct" and human reason, however highly developed and widely contrasted may be the manifestations of the latter. Here is a passage from Erasmus's colloquy on "Amicitia" (Friendship), between Ephorinne and John (Erasmus himself), in which he endows a Monkey with quite superior reasoning (contrivance after reflection) powers. The spelling is given as in the 1725 edition of Bailey:—

CLEVER TACTICS OF A MONKEY.

Joh.—That I may not be altogether Shot-free in this Entertainment, I'll tell you what I saw with my own Eyes, in the house of that famous *Englishman* Sir *Thomas More*: He kept in his House a large Monkey, who, that he might the sooner get well of a Wound he had received, was suffer'd to go loose. At the End of the Garden there were Rabbits kept in Hutches, and a Weesel used to watch them very narrowly. The Monkey sitting aloof off, quietly, as tho' unconcern'd, observ'd all his Motions, till he saw the Rabbits were in no Danger from him. But perceiving the Weesel had loosened a Board in the back Part of the Hutch, and that now they were in Danger to be attack'd in the Rear, and so be made a Prey to their Enemy, the Ape runs, jumps up on the Plank, and put it into its former Place, with as much Dexterity as any Man could have done. From whence 'tis plain that Apes are great Lovers of this Animal. So the Coneys, not knowing their own Danger, that used to kiss their Enemy through the Grate, were preserved by the Monkey.

ABOUT ADDERS: FACT OR FABLE?

Dr. Leighton has taught us a great deal about Adders, &c., in his 'British Serpents,' and obscure points are being cleared up in the columns of 'The Field Naturalist's Quarterly,' which only shows that we do not yet know everything about the habits

of a very common animal. Here is an extract from the same essay, which is very curious :—

Eph.—I saw once a very large and charming green Lizard fighting with a Serpent, at the entrance of a hole ; I wondered at first what was the Meaning of it, for I could not see the Serpent ; an *Italien* told me that the Serpent was within ; by and by the Lizard comes to us, as it were showing us her Wounds, and begging a Remedy, and did not only suffer herself to be touch'd, but as often as we stood still she stood still, viewing us very earnestly. The Serpent had almost gnawed away one of her sides, and of green had made it red.

Joh.—Had I been there, I should have had a Mind to avenge the Lizard's Quarrel.

Eph.—But her Enemy had hid herself at the bottom of the Hole : But some Days after we had the Pleasure to see her revenge herself.

Joh.—I am glad at my Heart ; but prithee how was it ?

Eph.—We happened to be walking near the same Place, and the Serpent had been drinking at a spring hard by, for it was so violent hot Weather, that we were like to perish with Thirst. A Boy of about thirteen Years old, the Man's Son where we lodg'd, having fled from *Bononia* for Fear of the Pestilence, happen'd very luckily to come by, with a Hay-Rake upon his Shoulder ; as soon as he saw the Serpent he cries out.

Joh.—Perhaps for Fear.

Eph.—No, for joy, rejoicing that he had found the Enemy. The Boy strikes him with the Rake, the Serpent rolls himself up ; but he laid on, till having broke his Head, the Serpent stretched himself out, which they never do, but when they are dying ; that's the Reason that you have heard the Apologist, concerning a Crab-Fish, who killing a Serpent that was his Enemy, when he saw him stretch'd out, says thus, *You ought to have gone so when you were alive.*

We have here a statement about a dying serpent (Adder) that is very suggestive. Whether the "stretching out" action is purely a muscular one, or one due to conscious volition—on the "feigning death" principle—I am not prepared to say ; but this I do know, that some Adders act in that way if violently struck on the head. A good many years ago, when walking across Arran from Brodick to Loch Ranza, I and two friends (both still alive) encountered many Adders sunning themselves on the roads and roadsides, the weather being extremely hot. Several of these I "poked up" gently with my stick, and pitched into

the grass or furze on the roadside. One large specimen, fully twenty inches in length, showed fight, and I gave it severe blows on the head and back. It stretched out, apparently stiffened and "dead." But it was not dead, for in a few minutes it recovered, and tried to escape, when another blow or two finished it off. I am inclined to think that the "stiffening" was due to muscular action produced by the stunning, not killing, blows.

BIRD REFERENCES BY ERASMUS.

These are scattered profusely throughout all his works, and are invariably free from myth or poetic fable, so beautifully employed by Shakespeare, Ben Jonson, and other great writers of the "Spacious Age of Great Gloriana of the West." Erasmus's references, in fact, are mainly those of a field-naturalist. No doubt, apart from his intuitive love of wild life, faunal and floral, his habits afforded him great scope for very varied observations. Erasmus was a great traveller, and he wandered leisurely on horseback in many lands near and far. In his day, too (1467?–1536), animal life (*Feræ naturæ*), even in this country, was exuberant, man's ingenious theories about "regulating the balance of nature" not having arisen, nor, indeed, for many years afterwards. Here are some of the bird references, taken almost "at random," from his great works, and even private letters to friends:—

"What place is for us where so many jackdaws cawing, and magpies chattering."

"Just like a bird in a cage; and yet, ask if it would be freed from it, I believe it will say, no. And what's the reason of that? Because it is bound by its own consent."

"Why, sir, are you not ashamed of it? No; no more than a Cuckoo is of his singing."

"Are you not ashamed, you sleepy sot, to lye-a-bed till this time of day? Good servants rise as soon as it is Day, and take care to get everything in order before their Master rises. How loth this drone is to leave his warm nest; he is a whole hour a scratching, and stretching, and yawning."

This passage stands in need of explanation. In Bailey's translation he, strange to say, uses the word "drone," whereas in the original colloquy it is "Cuckoo." The Rev. E. Johnson,

M.A., who furnished notes to later editions of Bailey's translation, says it is used as "a classic term of reproach for what sailors call a 'lazy lubber.'" Pliny's explanation of it is that it was a mark of sloth if the vine-dresser delayed the work of pruning until the Cuckoo's note was heard, *i. e.* till after the spring equinox. Hence, by association of ideas, the passer-by would "slang" him as a Cuculus! (Pliny xviii. 26). This is a far-fetched explanation. The habit of the bird in laying in another bird's nest seems to be an adequate explanation of the use of the name as a synonym for sloth, drone, &c.

"This peace and quietness is owing to my (Folly) management, for there would otherwise be continual jars, and broils, and mad doings, if want of wit only did not at the same time make a contented cuckold and still house; if the Cuckoo sing at the back door, the unthinking cornute takes no notice of the unlucky omen of others' eggs being laid in his own nest, but laughs and kisses his dear spouse, and all is well."

"What, are you an Augur then?"

"Yes, I am."

"Pray by what Auguries do you prognosticate all this? What hath the night Owl appeared lucky?"

"She flies for fools."

Erasmus has many references to Owls, and, as in the above, mainly of a classical and mythical character, allusions only made to turn the myths into ridicule. He was too sound a naturalist to believe in the old Owl myths, of which many are still preserved in classic literature, folk-lore, and even in immortal poetry:—

"Hark! Peace! It was the Owl that shriek'd,
The fatal bellman which gives the stern'st good night."

"The Owl shriek'd at thy birth, an evil sign."

"The Screech-owl, screeching loud,
Puts the wretch, that lies in woe,
In remembrance of a shroud."

I have marked many passages in the works of Erasmus, all bearing directly on phenomena of natural history; also in the works of his friend Sir Thomas More, of ever blessed memory; but in the meantime the above must suffice.

THE TEMPERATURE OF INSECTS.

BY GEOFFREY SMITH.

NATURALISTS whose pleasure it is to try and enter sympathetically into the conditions and capacities of all living things will be greatly interested in an account which Prof. Bachmetjew, of Sophia, has published of his experiments on the temperature of insects.* This account tells us in a clear and masterly manner of an excursion into the field of invertebrate physiology—a field too little cultivated by professed biologists, owing, it must be supposed, to the great difficulties encountered, and not to the innate barrenness of the land; indeed, it seems that the problems of biology, which have been so long attacked from an almost purely morphological standpoint, can at this stage of enquiry only be further elucidated by a wider and more searching scrutiny of organs and organisms from the point of view of function. This wider view of Biology is one which is likely to find favour with readers of 'The Zoologist'; and since the researches under consideration are directed towards the advancement of knowledge in this direction, and since they may not be readily accessible to all naturalists, I have ventured to think that a short abstract of Prof. Bachmetjew's work, with a discussion of its bearings on certain problems of insect coloration, might be acceptable.

We need not occupy ourselves for long in considering the Professor's method of research; it is essentially simple and accurate. The fact is well known to physicists that when two suitable metals are placed in contact an electric current is generated, and this current is accurately proportionate in strength to the temperature of the two metallic poles. In the researches which we are going to describe the metals employed were steel and manganese; the insect whose temperature was to be taken was pierced by a fine needle of this composition, and the strength

* 'Experimentelle entomologische Studien,' von P. Bachmetjew. Leipzig, 1901. Erster Band.

of the current induced by the contact of the two metals inside the insect's body was measured by means of a galvanometer; the changes in strength of the current indicated the changes of heat in the insect's body.

The book begins with an historical review of the work of naturalists on this subject since the time of Réaumur in 1734; among other names we notice that of the English naturalist Newport. The conclusion to be drawn from this earlier work is that very different results may be obtained from working at the same material; that the temperature may vary within wide bounds without prejudice to life, and that this variation of temperature is largely dependent on the temperature of the surrounding medium. But the temperature of the surrounding medium is not the only factor in determining the temperature of insects, and it is the first merit of Prof. Bachmetjew's work to have fixed and defined the other important factors which co-operate with it. He separates these factors under four heads—1, the influence of the temperature of the surrounding air; 2, influence of moisture; 3, influence of exercise; and 4, the influence of food and respiration.

The first experiments described were made with the Hawk-Moth (*Deilephila euphorbiæ*). It was found that at temperatures higher than 37° C. the temperature of the moth was always lower than that of the air, the greatest difference being 2·5°, when the moth was at 45·1° C. Above 48·1° the insect ceased to flutter, at 48·6° its wings sank, and at 51·4° it died. At death the temperatures of the air and of the moth were equal. These experiments were conducted in air of normal moisture, but when the air was supplied with additional vapour a different result was observed, for then the insect had a higher temperature than that of the air, and its wings did not sink until a body-temperature of 53° was reached, the air being at 49°. This effect is probably brought about by the moisture in the air preventing evaporation of the insect's juices, and so preventing cooling; while the normal metabolism of the insect naturally tends to raise the temperature. At low temperatures the temperature of the insect was always higher than that of the air. It is interesting to note, in relation to the effect of evaporation, that hairy insects tend to have a higher temperature than smooth, and this fact may

be well explained by the prevention of evaporation from the former.

With regard to the effects of exercise, it was shown by Newport that the temperature of an insect at rest is always lower than when it is in motion; while Lecoq found that a species of *Sphinx*, during active motion, reached the normal temperature of birds, which is peculiarly high. Bachmetjew has considered the influence of exercise at ordinary room temperatures, at heightened temperatures, and under the application of cold. He found that at ordinary room temperatures (18.5°) *Sphinx pinastri* raised its temperature by rapid wing-vibration up to 36° . At this point the vibration ceased, owing to a partial paralysis of the wing-muscles; the temperature then dropped, and the paralysis passed away. On repeating the rapid vibration immediately paralysis set in again more rapidly, but not until the temperature reached 36° ; furthermore, if the surrounding temperature was increased, less humming is required to bring on partial paralysis. There is therefore considerable ground for assuming that it is the heightened temperature which causes the partial paralysis. Just as there is a maximum temperature which brings on paralysis, so there is a minimum; thus *D. euphorbiæ* ceased rapid vibration when its temperature was at 17.6° , and all movement stopped at 0.5° . Putting these observations together, we see that for the Sphingids observed normal flight is only possible roughly between the temperatures of 18° and 36° C.

The influence of food and of respiration is only touched upon, but we may gather that everything that tends to increase metabolism tends also to raise the temperature.

In the second part of the volume the vital temperature extremes of Lepidoptera are discussed, especial attention being paid to the minimal temperature; and at the outset a very curious phenomenon is offered for consideration. If a butterfly or moth be cooled by being kept in an iced chamber, a certain point of under-cooling is reached (called the critical point, or K); at this point the temperature suddenly rises through more or fewer degrees, and freezing takes place at a temperature above the critical point (called the normal freezing-point, or N). This behaviour of the juices of insects shows a striking analogy to the under-cooling of water under certain conditions. This process

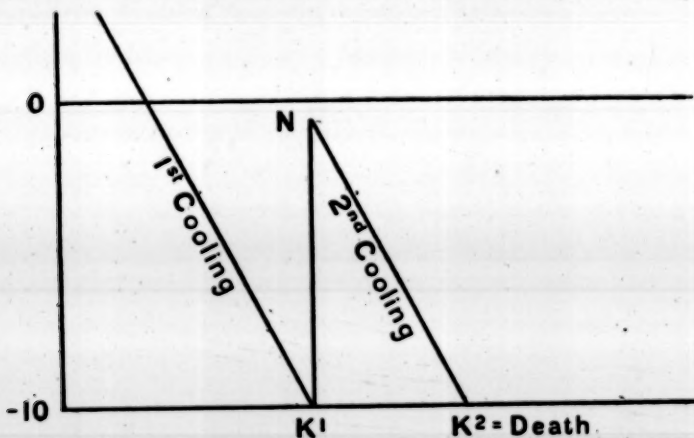
of under-cooling and freezing does not cause death on the first occasion, but, if the process be repeated for a second time, the insect dies when the critical point is reached for a second time. This is indicated by the following experiments on *Aporia crataegi*, the black-veined white:—

1st lot.— $K = -10^{\circ}$, $N = -1.2^{\circ}$. When N was reached the animals were removed from the ice-chamber, and lived.

2nd lot.— $K = -8^{\circ}$, $N = -6.8^{\circ}$. On under-cooling again to -6.5° , and removing the animals, they still lived.

3rd lot.— $K = -6.8^{\circ}$, $N = -1.1^{\circ}$. On under-cooling again to -10.0° , death occurred.

These facts may be graphically represented thus:—



Both the critical point and the normal freezing-point vary not only in different species, but in different individuals of the same species, and at different life-stages of the same individual. Indeed, many factors play a part in determining the nature and relations of these points, such as the rapidity with which the cooling takes place, the sex of the insect, the quantity of food it has eaten, and the amount of time it is kept at any particular temperature.

The number of degrees lying between the critical point and the normal freezing-point is complicatedly dependent on the rapidity of cooling, but the alternatives are so various that it is impossible at present to draw any concise conclusion with regard to them. It is an extremely interesting discovery that males have normally a greater difference between their critical and normal freezing-points than females; but this difference is

equalized by prolonged hunger. This points to one of those curious relations between sex and alimentation, which are so striking and yet so difficult to fix exactly.

In this short review of Prof. Bachmetjew's results, it is hoped that enough has been said to show that a considerable foundation has been laid down for further researches; but reference should be made to the book itself, which is full of carefully tabulated experiments, and most clearly expressed deductions from them.

It is clear that in dealing with the temperature of insects we have to do with a complex phenomenon dependent on a variety of interacting factors, some of which we have already touched upon. In the remainder of this paper I intend to consider one factor which I believe will have to be taken into account if we wish to gain a complete idea of the temperature relations of the so-called poikilothermic animals, *i.e.* animals whose temperatures vary with the surrounding medium. This factor is colour. The radiant powers of differently coloured surfaces are notably different; those surfaces which absorb the long-waved colours are better radiators than those which absorb chiefly those colours which lie at the other end of the spectrum. The emissive and absorptive radiant powers of a substance are directly proportional—a good radiator is a good absorber; it must also be remembered that a good reflector of radiant heat is a bad absorber and radiator, and *vice versa*. It has for long been pointed out that a dark coloured animal would be able to take advantage of sunshine more readily than a light coloured one, and Lord Walsingham used this fact in explaining certain phenomena of melanism in Lepidoptera. In the controversy which arose on this head nothing conclusive was reached, but a certain amount of evidence was brought forward to show that on the whole, in regions where the sunshine was intermittent, a melanic tendency in the Lepidoptera became the rule rather than the exception. My chief collecting-ground for Lepidoptera abroad has been Haute Savoie, in the neighbourhood of Mont Blanc, and I have been struck there with the fact that the two kinds of butterflies which frequented the highest mountain regions were, on the one hand, the dark brown *Erebias*, and, on the other, the white *Pierids* and pale *Coliads*. This contrast struck me for some time as inexplicable on the theory that the colouration bore any

relation to the temperature, but a little consideration showed that the white wings of the *Pierids* might act as reflectors of heat, glancing off the sun's rays on to the black body of the insect, which would thus absorb a greater quantity of heat. I have since tried many experiments in order to test this hypothesis; the bulb of a sensitive thermometer is tied round with black cloth, and hung up in bright sunshine. This morning a thermometer so prepared registered a temperature which varied between 30° and 31° C. I then backed the thermometer with a sheet of white paper folded so as to imitate the position of a butterfly's wings when expanded upon a flower. In three minutes the temperature had risen to 35° C., and was still rising when I removed the paper; the temperature immediately dropped. I repeated the experiment, substituting the cups of variously coloured flowers—such as poppies, Canterbury-bells, and so forth—to take the place of the white paper, and I obtained rises of temperature through two or three degrees, according to the reflecting powers of the various colours; the worst reflector being a dark purple larkspur, and the best a bright red poppy, which increased the temperature from 30.3° to 33.5° C. in a few minutes.

I surmise therefore that the influence of colour on the temperature of Lepidoptera is not so simple as it is usually assumed to be; on the one hand, the wings may absorb heat directly; on the other, they may be used as reflectors. It has been urged that the absorption of heat into the wings is a useless proceeding, since they are largely composed of dead structures; but it must be remembered that hæmolymph is present between the lamellæ of the wings, and I conceive that a circulation of this hæmolymph occurs from the body to the wings, and *vice versa*, owing to the movements of the wings and body.

Butterflies and flowering plants afford us, both in variety and brilliance, the greater part of the great boon of colour in animated Nature; both of these orders of beings are in general dependent for the fulfilment of their vital functions on warmth and sunshine. The dark centre of the poppy, where the sexual products are matured, is encircled by a broad open tent of crimson, which flashes from its walls the most potent of the sun's rays. If we are to compute the circumstances favourable to the certain and

speedy occurrence of the chemical action which brings about the maturation of pollen and ova, we cannot neglect this factor of colour. The dusky mountain *Argus*, gathering radiant energy in its wings and body on a sunny slope, at the onset of an alpine storm creeps into the cover of the thick grass, where radiation from its body-surface is not so rapid as in the open air; it folds its wings above its body, and this again prevents rapid radiation from the vital regions so covered. If it be one of those *Erebias*—such as *E. lappona* or *tyndarus*—which are confined to the highest regions, it offers to the expanse of the outside air not the dark brown of its upper surface, but the lighter grey of the under side of its hind wings, which thus have a lower emissive power. Again, we cannot neglect the factor of colour in determining the vital capacities and functions in so far as they are influenced by temperature.

My object in these remarks has been to draw attention to some experiments by Prof. Bachmetjew on the temperature of insects; these experiments confirm the opinion that the effects of Nature are seldom brought about by causes acting singly, but by a complex interaction of many simple causes.

The surface colour of organisms must certainly be taken into account when considering their temperature relations; there appear to be suggestions in Nature that certain colours have been selected as being advantageous to the animals possessing them, owing to their absorptive, emissive, and reflecting powers; and this factor may have acted in common with many others, known and unknown, in producing the varied effects which we see and admire.

COLLECTING SMALL MAMMALS IN N.W.T. CANADA.

BY EDWIN HOLLIS.

WHILST staying in the neighbourhood of the Touchwood Hills, Assa, N.W.T. Canada, from July, 1901, to April, 1902, I occupied my spare time collecting small mammals for the British Museum. This district is situated about 51.5° N. latitude, 104° W. longitude, and is about 3000 ft. above sea-level. The country is slightly undulating, open prairie and bush being fairly evenly distributed, interspersed every few miles with lakes. These are all more or less alkaline, some of them so strongly as to kill cattle if they drink any quantity of the water; they naturally contain no fish. There is no fresh running water, but many sloughs (shallow ponds), caused by melting of the snow. The temperature varies from great heat in summer to 40° below zero in winter.

I obtained one or more specimens of twenty-three different species of mammals, which I think are nearly all the wild animals to be found in this district at the present time, although Lynx, Bear, Deer, and Jack-Rabbit are occasionally to be met with. I saw one of each of the two last-named, and these were the only animals I saw of which I did not get at least one specimen.

The following is a list of animals obtained, with remarks on same.

Canis latrans (Coyote; locally called Wolf).—Not at all uncommon, several often being seen during the course of a day's drive. They are practically never dangerous to human beings unless driven into a corner, but are a great nuisance to ranchers, as if they once take to killing sheep or calves they seem to prefer them to other food. Those I got were all caught with hounds, except one suffocated in his earth, for they are too wary to be trapped. Although I set traps round an earth which I knew contained young ones about the size of a small Fox-Terrier, I never had one struck.

Taxidea taxus (Badger).—Not nearly so common now as a few years ago. These were also taken with hounds, except one, drowned out. They are hardly ever seen by day if the weather is fine, but on dull, misty days seem to travel a good deal.

Vulpes fulva (Fox).—Fairly plentiful. Their skins form one of the principal trade furs of the district, prices varying from $2\frac{5}{8}$ dollars for an ordinary Red Fox, to 150 dollars for a Silver Fox. The latter is very rare, only one being taken by an Indian in the season 1901-2. They are taken with hounds, shot, or trapped. I fancy they kill a considerable number of Newts, as I could often see Newts' tails strewn round large stones near a lake, where I could only find Fox tracks.

Mephitis hudsonia (Skunk). — A few years ago these animals were fairly plentiful, but are now getting scarce. I shot mine; but the Indians find where they are lying up for the winter, five or six in a hole, and smoke them out. When annoyed they smell very bad, and great care must be taken in skinning not to cut the gland containing the scent, which is placed immediately under the skin just below the anus. I found it best to remove the gland before commencing to skin. When killed by hounds the smell causes these animals to froth at the mouth, roll on the ground, and bite up mouthfuls of earth, but it does not appear to frighten them from going for the next one they see. The scent is very lasting. I took particular note of a terrier which killed one, with the idea of seeing how long I could notice the smell, but unfortunately after a month she killed another, so I could not tell, but up to that time it was quite unpleasant, particularly if she got wet. I am rather inclined to think, from the quivering motion of the Skunk's tail when attacked, that the scent is ejected on to the tail, and flung from that on to the animal attacking. They are very destructive if allowed to get into a hen-house, killing a large number of the birds, which they neither eat nor carry away.

Putorius longicaudus and *P. cicognani* (Ermine).—Not very common. These are locally called Weasels when alive, but Ermine as fur. Mine were trapped with either beef liver or "Prairie Chicken" heads. The same caution as applies to Skunks requires to be observed in skinning, but the smell is not nearly so strong or lasting. Their habits appear to be the same as those of the English Stoat.

Putorius vison (Mink).—Uncommon. The only one I obtained was taken in a gin. The usual plan for trapping is to make a hole part way through the top of a Musk-Rat house, and there place a trap, for when the Mink is hunting Rats, of which its winter food principally consists, it is sure to try to enter by the hole already partially made.

Lepus americanus (locally called Rabbit).—Has been to a great extent killed off in this district by a succession of prairie fires. It inhabits bush country, and never appears to make its form in the open. I saw no young ones, but was told by half-breeds that they have from three to four at a litter, generally under a fallen tree, not in a burrow. They are easily snared in wires.

Fiber zibethicus (Musk-Rat).—More plentiful this year than they have been for many preceding ones. The skin of these animals is the principal fur taken here. Many thousands are trapped annually, their bodies forming one of the chief articles of an Indian's winter diet. The young are born in a hole in the bank, not in the Rat-house. Trapping these is a very simple matter, as you only have to find a sheet of water too deep to freeze to the bottom, and containing Rat-houses. Make a hole in the top of each house till you can feel the platform used by the Rats on emerging from the water. Place a trap on this and close the hole again carefully to prevent the water-hole freezing. You will probably have one in a very short time, when the process can be repeated till the house is cleared out, and then the water-hole will freeze. The houses contain from two to five Rats.

Spermophilus richardsoni (Grey Gopher).—Very numerous. They live in colonies in burrows on the open prairie, and are a great nuisance to grain-growers, as they gnaw off the straw at the first joint when about eighteen inches high (it is said for moisture), sometimes clearing a space of an acre or two as if mown. They also store grain for the winter. At time of going into winter quarters they are very fat, and are then much sought after by Indians as food. Colour varies from pale grey in winter to quite a yellow tinge in summer. Last seen in fall, 1901, on October 20th. First seen in spring, 1902, on April 1st. Easily caught in gins.

S. tridecemlineatus (Striped Gopher).—Not very common.

They have practically the same habits as the Grey Gopher, but usually only two live in each hole.

S. franklini (Grey Squirrel).—Not very plentiful. Burrowing animal, inhabiting bush country. Pair of old ones and family live together. They appear to me to hibernate earlier in fall, and come out later in spring than the other Gophers. First seen in spring, 1902, on April 29th.

Thomomys borealis (Pouched Gopher; locally called Mole).—Very common. My specimens were all trapped underground. Habits appear to be much like those of English Mole. Last seen in fall, 1901, at beginning of October. First seen in spring, 1902, on February 9th; but they evidently work during the winter, between the snow and earth, as their arched runs can be seen in the grass when the snow thaws. The Indians have an idea that their cheek-pouches are inflated with air, and then compressed to force up their earth mounds.

Tamias quadrivittatus (Chipmunk).—Not very plentiful. They are easily caught. Best bait, almond. If fed while still wild, they soon become tame enough to run in and out of the house. The first I saw, in spring, 1902 (caught April 13th), had barley in cheek-pouches, and was quite a quarter of a mile from nearest barley-field or granary, so evidently had a winter store.

Lasiurus cinereus and *L. borealis* (Bats).—Very few about. I only obtained one of each species, both being taken by hand while hanging in poplar trees during the daytime. The Indians call them little birds with bare wings.

Mus musculus (House-Mouse).—Not very plentiful, but seems to be evenly distributed over both prairie and bush. This appears to be the only very small animal which is constantly about during the coldest weather.

Zapus hudsonius (Jumping Mouse).—Not very common. Frequents very high grass in swampy places. I could never secure one in a trap, although I tried all sorts of baits and traps. Those I did catch were taken by hand, whilst following mowing-machine when cutting hay.

Sorex richardsoni (Shrew).—I only saw and caught one. Bait, cheese.

Onychomys leucogaster (Short-tailed Mouse).—Rare. I understand this has not been previously reported as taken in Canada.

Caught in traps; bait, cheese. It is locally accused of killing young chickens, but I could obtain no reliable evidence on the point.

Evotomys gapperi (Red Vole).—Uncommon. I only caught them on cultivated land.

Microtus (Pedomys) minor (Grey Vole).—Not at all uncommon. Appears to live only in very wet places. I fancy, from remains of shells found in tussocks of rush where they were caught, that their food consists partly of water-snails, although I could not catch one, using snail as bait. Trapped with cheese and almonds.

Microtus drummondi (Brown Vole).—Very plentiful. Appears to be equally distributed over open prairie, bush, and cultivated land. One caught by hand, January 28th, 1902, in open, when thermometer registered 30° below zero.

An old half-breed trapper—who has for many years made the greater part of his living by trapping fur for the Hudson's Bay Company, who do a large business with the Indians, trading goods for fur—gave me many useful hints, on which one or two notes may be of use to other collectors.

When trapping, if unsuccessful, try change of both bait and style of trap, as one or the other will frequently result in a catch where traps have remained for days untouched. Best bait for Mice, Voles, &c., cheese and ordinary eating-almonds. Smoke and water will be found useful in getting burrowing animals where traps are not at hand. For small holes, pour water in gently, and the occupant will gradually come to the top to escape it; if poured in too fast, they are drowned inside. For large holes, make a good fire in the mouth of one hole; when well alight put on a good handful of grass; immediately close both that hole and all others, except the one from which you wish occupant to bolt. If, as sometimes occurs, the animal remains to be suffocated, it is lost, unless it can be reached with a pliable willow. Select a willow having several branches at the thin end growing close together, cut these off so as to leave a bunch of ends about three-fourths of an inch long. This can then be inserted into the hole till the animal is felt, when by gently twisting the stick the fur will usually get hung up in the short ends, and the animal can then be drawn out. It is impossible

to dig out burrowing animals in winter, as the frost penetrates about four feet.

The gins used by the fur-trappers are, for the collector, much superior to those sold in England, as in the first place they have no teeth, and consequently do not tear the skin; and, secondly, the under part of the spring is put on with a ring round the jaws, like the upper part, so the trap can be bent either way to fit an angle in the hole or run.

NOTES ON THE NESTING OF THE INDIAN
DABCHICK (*PODICIPES CAPENSIS*, B. M. CAT.).

By F. FINN, B.A., F.Z.S.

THE Indian Dabchick is not common on the "tanks" about Calcutta—at any rate, I have never seen one myself except on that in the Indian Museum grounds, where I have from time to time turned out many specimens procured in the Bazaar, most of which soon disappeared. At last, however, a pair stayed, and in the autumn of 1900 built a nest in some bulrushes, a few feet only from a masonry platform. Four young were hatched, but disappeared during the floods which took place during that autumn, having probably either fallen a prey to fish, or perished through exposure. The parents, however, took heart, and built again a few feet to one side of their previous site; and I took the following notes on their proceedings:—

October 3rd, 1900.—Saw one egg in Dabchicks' nest, freely exposed all day, and looking very large; one bird hanging about.

4th.—On going to see the bird, it pulled some weeds over the nest, in which no eggs were visible, being no doubt covered already. The bill was used in the covering process, not the feet.

5th.—The bird slipped off at my approach alone, leaving two eggs uncovered, but stayed near as on the previous day. Later, I went with Major Alcock, who was also interested in the birds, and the bird covered the eggs and stayed near, as on the previous day, when we had been together.

8th.—The bird covered the eggs, and got off when I approached.

9th.—The bird did not get off the nest when I went to see it.

(The birds later on did not sit in the day, or even stay near the nest.)

24th.—Bird sitting very closely; she raised herself, and let me see the eggs (two only), now of a buff colour, and then spread out her feathers, and settled down on them.

25th.—About midday I saw the bird rise and cover the nest, and get off, when a young one crawled (on all fours) after her, and crept under her wing on the water. She was brooding in the evening.

26th.—I thrice saw the old bird go off, leaving still two eggs.* On the first occasion I saw no young; on the others it crawled off, swam to her, and crept under her long flank-feathers, the legs disappearing last; on the third occasion I could see all this distinctly.

November 5th.—I saw for the first time the young birds swimming in the open water, and following the parent. Until now they have almost always been on its back, where one could see the two heads [one more bird had been hatched] sticking up, the bodies being under the old bird's wings. They were sometimes on the nest, but rarely just outside it. They could not walk or even stand up at first. The larger parent was the carrier.

7th.—Saw young birds, right over at the other side of the tank, dive for the first time.

11th.—Watched the old one go on to the nest at night, and one young one, which had been standing up, get under its parent's wing, but had to leave for fear of disturbing them. The old birds bullied some Ducks to-day, but not a Coot; while neither Coot nor Ducks took any notice of their young.

13th.—Saw the young—one with each parent—separate, at opposite ends of the pond.

16th.—I saw the smaller young bird pecked away by one parent which it was accompanying, and crying very loudly; while the other young was on good terms with its attendant old bird. Later, I saw both together with one old bird, which drove both away; but then more than once fed the smaller one, deliberately driving the other off; this larger chick was

* I do not know how I could have overlooked the third egg, but probably it was covered on the 24th, when I saw the other two.

hunting for itself. Later, saw them all near each other; both young hunting. [The food was shrimps and insects; no fish given as yet.] One parent—the smaller—was sometimes alone now.

21st.—Saw only one old Dabchick, feeding one young bird, but repelling the other larger chick. The nest has now disappeared.

25th.—I found the bigger young bird some little way out of the water, near the servants' quarters. The men said they had put it back, but it persisted in coming out again. I took it indoors. It only showed the striped down on the head, and the quills were growing. The beak was buff and black, not pink as when new hatched. I had seen it hunting for itself for some time, but only on the surface, although both young were more ready to dive on alarm than the parents. Only one parent was in company with the other.

26th.—The young bird taken out yesterday died this morning, although I had fed it; it proved on skinning to be very thin, with no fat even on the skin.

27th.—The other young bird still with the one parent now remaining on the tank, and being fed; it is still more ready to dive in fear than the old one, and keeps very close to it, though nearly as large.

December 1st.—Young Dabchick still with parent, and on the most familiar terms, trying to climb on its back. [They often did this when first compelled to paddle their own canoes at an earlier age.]

8th.—Saw the old bird feed the young one with a fish, the first time I have observed this food given.

15th.—Saw the old bird driving the young one.

16th.—Saw the young bird first fed and then driven off.

17th.—Saw the young bird fed simply,

22nd.—Saw the young bird well chased by its parent, and trying to associate with Coots (now two). It crouched somewhat when frightened by its parent, as when wanting to be fed.

23rd.—The two Dabchicks near each other, but the young one evidently in fear of the old.

24th.—The young bird chased by the old one, which I saw, later on, feed it nevertheless.

A few days later I saw the young bird, which was now full-winged, trying to fly.

January 7th, 1901.—I saw two old birds on the tank (the absentee having evidently returned) on good terms, meeting and chattering; no sexual display, however, though both are in full plumage, equally showing rufous on neck. [I have since watched them through another winter (1901–1902), and seen them retain full plumage all the time.] Young bird apart, flying once or twice, as well as an adult.

March 2nd.—Both old birds still present, in summer plumage, and carrying nesting material. When courting, the bigger bird chatters most, and expands the flank-feathers slightly. A new bird, in almost complete winter* or immature plumage, which I put on, was chased by one old bird at least, as their young one has always been of late when they are near it. I saw this not long since, when threatened, stoop supplicating, as when about to be fed.

After this I took no systematic notes, but one or two occurrences which I have not dated seem to me to deserve notice. On one occasion I saw one of the young—then very small, and being carried by one parent while the other hunted for them—trying to swallow a large bright red dragonfly, which was obviously too big for it. The parent carrying it, on this, turned round and took the insect away.

On another occasion the carrying parent, on my approach, swam away from the nest with the young on its back, and the other hastened to it, and there was much chattering. Then the unburdened parent swam to the nest, made a peck at it—I being there all the time on the platform overlooking it—and then went back to its partner, when there was more chattering. The whole performance looked as if this bird had inquired as to the cause of

* It is obvious, from what has been said above, that the so-called winter plumage is merely that of immaturity in this species. I have never seen the pair of birds whose actions I have here noted in any but full adult summer plumage at any time. It is possible, of course, that this pair are abnormal, or very old individuals, but there is no proof of this, and they are free birds leading a perfectly normal life in every way. (See B. M. Cat. vol. xxvi. p. 517, on *Podiceps tricolor*.)

its partner's alarm, and had gone to reassure it by examining either me or the state of the nest! I have no doubt that the old birds know me.

I could not see that the very beautiful striped colouring of the tiny pink-billed young was at all protective, and the brooding old bird, with the young *on its back* under the wings, was more conspicuous than when not so occupied, owing to the partial distension of the wings causing the white secondaries to appear in a very noticeable patch.

ORNITHOLOGICAL NOTES FROM SURREY.

BY JOHN A. BUCKNILL, M.A.

(Concluded from p. 231.)

OSPREY (*Pandion haliaëtus*).—Mr. Styan tells me that Mr. W. Stafford informed him that the specimen referred to in my 'Birds of Surrey' (p. 200) as having been shot at Abbot's Pond, was killed there in 1840. This specimen is in the Charterhouse Collection. Another, which was in Mr. Stafford's possession, and which was probably one of those sold apart from the main collection, was obtained at Forked Pond, near Thursley. This is one of some three or four specimens which were sold at Stafford's sale without locality or date, and were not included in the type collection sold to Charterhouse in 1891.

NIGHT HERON (*Nycticorax griseus*).—A fine adult male was shot at Ditton Marsh on June 12th, 1855, and preserved by F. Yearley (F. Styan and J. Mitchell).

LITTLE BITTERN (*Ardetta minuta*).—A male was shot on the Thames, at West Molesey, about the year 1870, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

BITTERN (*Botaurus stellaris*).—Mr. Styan and Mr. Mitchell had notes of the following specimens not hitherto recorded:—

1. A female shot in 1844 by Mr. W. Simmons near New Mill, Haslemere.

2. A male shot at Woodside, Esher, in 1855, in October.

3. A male on the Mole, near Molesey, in the same month of the same year.

The two latter were preserved by Mr. F. Yearley. Mr. F. H. Birley informs me that he saw a specimen, shot on Dec. 30th, 1884, on a now drained mill-pond at Lingfield (*in lit.*).

WHITE SPOONBILL (*Platalea leucorodia*).—Mr. Gordon Dalgliesh informs me that he has seen a specimen which was shot on a small pond at Claudon Park on Nov. 26th, 1901; it was a female,

and was preserved by Mr. Braddon, of Guildford. It was recorded by him in 'The Zoologist,' Jan. 15th, 1902, p. 32. It is the first record from Surrey since the year 1862.

GREY-LAG GOOSE (*Anser cinereus*).—A specimen was shot at East Molesey, on the river, in hard weather, in January of 1880. It passed into Mr. F. Yearley's hands for preservation (F. Styan and J. Mitchell).

BEAN GOOSE (*A. segetum*).—Capt. E. Barnard Hankey informs me that in the winter of 1892 a specimen was shot by himself and his brother at Cannon Farm, Fetcham, on the bank of the River Mole. It is preserved, and is now in the possession of J. Barnard Hankey, Esq., of Fetcham Park, where I have examined it. I am glad to be able to record this the second definite instance of the shooting of this species in the county. The only other local example of which I am aware was shot near Godalming in 1841, and is now in the Charterhouse Collection.

BERNACLE GOOSE (*Bernicla leucopsis*).—In the winter of 1875 a specimen was shot on the Thames, at Thames Ditton. It was preserved and exhibited at the 'Bear Inn,' Esher, being stuffed by Mr. F. Yearley (F. Styan and J. Mitchell).

POCHARD (*Fuligula ferina*).—One was shot at West Molesey on Jan. 8th, 1869, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell). On Fetcham mill-pond—which, owing to its numerous springs, is seldom, if ever, frozen over, and is consequently a favourite resort for duck in hard weather—this species frequently occurs. Capt. Hankey informs me that he has seen as many as thirty or more together on the lake, and on one occasion killed no fewer than eight in one afternoon. He has some specimens preserved from that locality, and on Boxing Day, 1901, shot one out of a small flock which were on the water. On the 5th January, 1902, a male was observed by Mr. Gordon Dalglish on Forked Pond, near Milford (*in lit.*).

TUFTED DUCK (*F. cristata*).—Capt. Hankey informs me that this species has occurred occasionally on Fetcham mill-pond in hard weather, and he has preserved specimens shot at that place. On Boxing Day of 1901 a pair were observed and one shot by him on that water. This specimen he kindly presented to me, and it is now in my possession.

SCAUP (*F. marila*).—A male was shot on Jan. 10th, 1877, on

the Mole, close to its junction with the Thames, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

GOLDEN-EYE (*Clangula glaucion*).—Capt. Hankey informs me that he has shot specimens on Fetcham mill-pond; he has three examples from the lake. A female shot, Shamley Green, Guildford, Nov. 17th, 1901 (Zool. 1902, p. 32, and *in lit.* G. Dalgliesh).

SCOTER (*Ædemia nigra*).—A specimen was shot at East Molesey on April 17th, 1878, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

GOOSANDER (*Mergus merganser*).—A male was shot at West Molesey on Jan. 10th, 1877, and preserved by Mr. F. Yearley. Mr. F. Styan saw a female in the flesh in Mr. W. Bradden's hands for preservation, which was shot during very severe weather on a pond near Farncombe, Godalming, on the 28th of January, 1881 (F. Styan and J. Mitchell).

SMEW (*M. albellus*).—Mr. R. W. Courage had a specimen in his collection—a female—shot near Thursley in 1874, in winter (F. Styan and J. Mitchell).

RED GROUSE (*Lagopus scoticus*).—For further notes on this species, and its connection with the county, I may refer your readers to this Journal (*ante*, p. 27).

QUAIL (*Coturnix communis*).—Mr. F. Styan saw one in Mr. Bradden's hands for preservation, which had been shot in September, 1880, near Guildford; and several were killed in the same autumn on Wey-Down Farm, amongst some clover not far from the same locality, by a Mr. F. Roberts (F. Styan and J. Mitchell). Mr. F. H. Birley, of Lingfield, informs me that he has eggs taken in June, 1893, at Little Bookham (*in lit.*). Mr. G. Dalgliesh has an egg from a clutch taken in a corn-field near Milford in 1893 (*in lit.*).

SPOTTED CRAKE (*Porzana maruetta*).—A male was shot at East Molesey on May 10th, 1871, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

WATER RAIL (*Rallus aquaticus*).—Mr. Gillman informs me that he observed this species on Wimbledon Park pond in the 'sixties on more than one occasion (*in lit.*). Mr. F. Styan shot a young bird in the summer of 1881 on the Wey, near Stoke, where it had doubtless been bred. Mr. G. Dalgliesh has a recent specimen from Abinger Bottom, near Guildford (*in lit.*).

COOT (*Fulica atra*).—Mr. F. Styan informs me that in former years, when this species was much more abundant on Frensham Great Pond than it is now, an annual battue used to be held there in autumn, on which occasions large numbers were killed. In 1880 over a hundred were shot on the first day, and upwards of fifty on the second.

STONE CURLEW (*Edicnemus scolopax*).—Mr. J. Mitchell informs me that in the summer of 1900 he observed two pairs in the county, which were undoubtedly nesting; he does not wish me to indicate the locality precisely.

DOTTEREL (*Eudromias morinellus*).—Mr. Mansell, the well-known taxidermist, of Farnham, informed Mr. Mitchell, in 1880, that about thirty years before that date he saw a small flock of five on the margin of Frensham Pond, three of which were shot and preserved by him. One of these would probably be the specimen mentioned by Mr. Spicer in this Journal (1854, p. 4367) as having been killed near Farnham shortly prior to that date, and as then in his collection (*vide* 'Birds of Surrey,' p. 285).

RINGED PLOVER (*Ægialitis hiaticula*).—A specimen was shot at West Molesey on May 7th, 1878, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

OYSTERCATCHER (*Hæmatopus ostralegus*).—A specimen was shot on the Thames, at East Molesey, in the autumn of 1872, and was preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

GREY PHALAROPE (*Phalaropus fulicarius*).—Mr. R. W. Courage had a specimen which he shot shortly prior to 1880, in the autumn, near Thursley (F. Styan and J. Mitchell).

WOODCOCK (*Scolopax rusticola*).—In and before the 'eighties the Woodcock nested regularly every year in the Thursley district, where Mr. R. W. Courage found the nest. In one morning during the winter of 1879–80, a Mr. R. Mason and another gun killed fifteen near Haslemere (F. Styan and J. Mitchell). Mr. Birley informs me that he knew of the nest in 1886 at Lingfield. This nest, which is referred to in this Journal in 1887, p. 194, had a curious history. It was first noticed by Mr. Herbert Fisher's gamekeeper on the 11th of April; it then contained five Woodcock's eggs and two Pheasant's eggs. One of the Woodcock's eggs was slightly cracked, and another much damaged. On the 16th of April, Mr. Fisher himself went to the nest, and

took away four of the Woodcock's eggs, and on the following day Mr. Birley saw the nest, from which a Woodcock was flushed, which had been sitting on the two Pheasant's eggs and the remaining egg of the Woodcock. Mr. Fisher retained two of the Woodcock's eggs, and gave Mr. Birley the other two. The fifth egg was broken beyond repair. The occurrence seems worthy of note, as the Pheasant was probably the interloper.

GREAT SNIPE (*Gallinago major*).—A very large Snipe was obtained during this winter at Ashted, and was supposed to be of this species; I found, however, on examination, that it was only a fine specimen of the Common Snipe.

COMMON SNIPE (*G. caelestis*).—Mr. Birley informs me that in the early 'eighties this species used to nest pretty freely in the neighbourhood of a now drained mill-pond near Lingfield (*in lit.*).

JACK-SNIPE (*G. gallinula*).—Messrs. Styan and Mitchell had notes of its occurrence near Guildford, Godalming, and Haslemere.

KNOT (*Tringa canutus*).—A male was shot at East Molesey in the autumn of 1877, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

DUNLIN (*T. alpina*).—A specimen was shot at East Molesey on April 10th, 1878, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

GREEN SANDPIPER (*T. ochropus*).—Mr. Styan had notes of the occurrence of this species prior to or in 1880 on the Tillingbourne, near Gomshall; on a pond at Witley; on the Wey below Guildford; at Newland's Corner, on the Merrow Downs; and on Reigate Heath.

COMMON SANDPIPER (*T. hypoleucus*).—Mr. Styan had notes of its occurrence in or prior to the year 1881 on the Wey near Sutton Park, at Sickle mill-pond near Haslemere, and at Little Frensham Pond.

CURLEW (*Numenius arquata*).—Messrs. Styan and Mitchell had the following notes on this species:—

1. A specimen was shot at Thames Ditton on Dec. 10th, 1880, and preserved by Mr. F. Yearley.

2. In the same year another was seen at Sickle Mill, near Haslemere, by a Mr. Simmons.

3. Mr. R. W. Courage stated, in 1880, that this species was

sometimes observed near Thursley, being driven inland by rough weather.

4. A specimen was observed in 1882 on Clapham Common by a Mr. F. W. Lucas.

It is also interesting to notice, in connection with the note which I recently communicated to this Journal (1901, July, p. 253) upon the nesting of this species on Chobham Common, in Surrey, that an individual was observed flying over that heath in October of 1900 by Mr. S. H. le Marchant (*in lit.*). On April 15th, 1902, I heard most plainly a large number migrating over Epsom about 11 p.m.

WHIMBREL (*N. phaeopus*).—Mr. Yearley preserved a specimen shot at West Molesey on Oct. 8th, 1879 (F. Styan and J. Mitchell).

BLACK-HEADED GULL (*Larus ridibundus*).—A flooded meadow close to the L. & S. W. Railway, near Earlswood, has constantly been frequented during this winter by a number of Gulls of this species; stragglers, doubtless, from the enormous crowd which now visit the Thames.

COMMON GULL (*L. canus*).—Mr. Styan had notes of its occasional appearance inland at Guildford and Haslemere (F. Styan and J. Mitchell).

HERRING-GULL (*L. argentatus*).—In 1901 an interesting occurrence of the breeding of this species in captivity occurred in this (the Epsom) neighbourhood. Mr. Theodore Bell, who had three specimens, found towards the end of May that two were pairing. He shut off the third bird (a cock), and on May 30th a nest of rough grass was completed. The pen in which the birds—which were, of course, pinioned—was quite a small one, being only about three yards by five yards in size. On June 1st one egg was laid, and on June 4th a second. The hen sat very close and well, and on July 1st one egg hatched out; on July 6th the second egg, which showed no signs of hatching, was removed, and on the following day the young Gull died. It was probably a mistake to remove the other egg, which doubtless afforded to the young bird some considerable support from the weight of the parent. I understand that the nesting of this species in confinement (particularly in a small pen, without more water than that contained in a drinking-trough) is of rare occurrence, and I had therefore pleasure in receiving three

photographs taken by Mr. Herbert Bell (Mr. Theodore Bell's nephew), which indicate very clearly the circumstances of the breeding of this bird.

COMMON GUILLEMOT (*Uria troile*).—Mr. W. Simmons, of Haslemere, informed Mr. F. Styan, in 1880, that his father had shot a specimen of this species on Sickle mill-pond, near Haslemere, in the year 1868, after a very severe storm (F. Styan and J. Mitchell).

GREAT NORTHERN DIVER (*Colymbus glacialis*).—In December of 1881, a specimen, weighing $8\frac{1}{4}$ lb., was caught with a rod and line at Virginia Water by the local fisherman, John Keene. The bird took a large Thames Dace which was being used as a live bait for Pike. It was landed after a forty minutes' struggle, and was sent on the following day to H.R.H. Prince Christian, by whom it is believed to have been preserved. Keene, its captor, wrote for Mr. Styan a lengthy account of the occurrence, which was incidentally mentioned in the 'Field' (December, 1881).

GREAT CRESTED GREBE (*Podiceps cristatus*).—Mr. A. Gillman informs me that in the 'sixties he noticed this species on Wimbledon Park pond (*in lit.*). During this winter one was seen on a lake not far from Milford (G. Dalgliesh, *in lit.*).

STORM-PETREL (*Procellaria pelagica*).—In October, 1852, one was shot at West End, Esher, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell). Mr. Simmons informed Mr. Styan that one was picked up dead on a road near Haslemere in 1865 (F. Styan and J. Mitchell). Mr. Dalgliesh records a male, caught alive at a street-lamp on Dec. 28th, 1901, at St. Catherine's, Guildford ('Zoologist,' *ante*, p. 32).

In addition to the above short list, I have received some very interesting communications upon the occurrence in the county of some curious species of obviously artificial introduction, such as the Rock-Dove, Black Swan, and Reeves's Pheasant; and also a considerable number of notes of the occurrence of species, which I do not feel justified in including in this list, owing to the records sent me being records merely of observation. The former have undoubtedly occurred, but only in a semi-domesticated, or even domesticated state; the latter, such as the Snowy Owl, Bar-tailed Godwit, White's Thrush, Rock-Thrush, &c., are without doubt erroneous and unreliable observations.

I might perhaps add to the foregoing notes a few local Surrey names which have recently been brought to my notice :—

CHRISTIAL = KESTREL.—(R. W. Courage, per F. Styan and J. Mitchell. A term used near Thursley ; obviously a mere local pronunciation).

TAPPHO = GREEN WOODPECKER.—(The same authority. The same remarks as to origin apply.)

FANNER = HEN-HARRIER. — (*Fide* Mr. R. W. Courage, of Thursley, per G. Styan and J. Mitchell. Probably an error for Kestrel, as "Wind-fanner" is a common local name for that species.)

I fear that this will be my last contribution for some time to the history of the avifauna in Surrey, as I am leaving England to take up duties in South Africa. I have endeavoured in these notes to bring up to date all my collected observations not mentioned in my book on Surrey Birds, and I hope that in the future some other ornithologist will periodically recapitulate the annual records from my own county.

NOTES AND QUERIES.

AVES.

Red-throated Pipit in Ireland.—In my note on *Anthus cervinus* (*ante*, 1901, p. 264), I mentioned one specimen from Donegal. As there is some doubt about this bird, I wish it to be understood that the record for Ireland must for the present rest upon the specimen-shot by me on Achill Island, May 25th, 1895. This latter bird has been certified by Dr. Bowdler Sharpe, Mr. Howard Saunders, and Dr. Hartert, and was exhibited by me before the meeting of the British Ornithologists' Club, October, 1901. I spent three weeks in Donegal, studying the Pipits of one particular district, and hoped to have worked up the material I collected before now; but pressure of other business has prevented me doing so. I therefore think it will be more satisfactory for this explanation to appear, pending the fuller inquiry I hope to make.—F. COBURN (Holloway Head, Birmingham).

Breeding of *Linota rufescens* on Wimbledon Common.—On June 22nd I found a nest of the Lesser Redpoll on Wimbledon Common. It was built in a thick birch, and was nearly ready for eggs. When I last visited it (on the 29th) it contained two eggs. For obvious reasons it will be as well not to give the exact locality, as I hope they will breed there again next year. I also found a nest of the Wood-Warbler (*Phylloscopus sibilatrix*), containing five eggs, near the same place. I further saw six pairs of Yellow Wagtails on different parts of the Common, and found two nests containing young, one of which was built almost in the centre of the Common amongst the gorse.—M. J. NICOLL (10, Charles Road, St. Leonards).

Notes on the Nesting of a Pair of Green Woodpeckers (*Gecinys viridis*) at Wells, Somerset.—In this district Starlings are so numerous in the breeding season that they have become a serious nuisance to the Green and Greater Spotted Woodpeckers. On May 20th, in an orchard at Milton, a pair of Starlings fought for, and took possession of, a newly finished hole of a pair of Greater Spotted Woodpeckers. On more than one occasion I have also watched battles between the green species and Starlings; the green birds are not so easily beaten off as

the Greater Spotted species. On May 5th I found a pair of Green Woodpeckers trying to occupy a last year's hole in one of the three large trees in Park Wood, not far from the Bishop's Palace, and which might more appropriately be called Nightingale Wood, for my finding of the Nightingale's nest and eggs in this wood is, I believe, the farthest point west of the island where the Nightingale has been discovered breeding. Five pairs of Woodpeckers have inhabited the wood this summer; the hole was about twenty feet up, and situated in the bole of the tree. The foliage of the nut-bushes not being sufficiently out at this date to hide me, the birds at first seemed shy to enter the hole. These trees, not in the least decayed, contain thirteen previous nesting-holes, chiefly in the various tall branches, and at this date all occupied by Starlings. Just above the old hole in question is a short branch, and on it two Starlings sat, and poured forth their mimicking notes, alternately dropping and turning into the hole; when swiftly—and, until then, unseen—one of the Green Woodpeckers flew at the hole, and drove the Starlings out on to the short branch. After having quite a tussle it flew up into the higher branches again. One or other of the Starlings repeated this act again and again, but each time a Woodpecker descended, and showed his superiority. I immediately thought of shooting the Starlings, but abandoned the idea, thinking it might frighten away the Woodpeckers. I spent hours on subsequent dates watching the hole, and, as a rule, had not long to wait before seeing one or both of the Woodpeckers; one would come silently from a near oak, and sometimes alight on the trunk some feet above the hole, where it would stay for some minutes, and peep at me round the tree, the head and beak only being visible. It would then utter its loud "plew plew" notes, as if to tell its mate that danger was nigh; the cry was answered from close by; then, with a mode of progression something between a jump and a climb, it descended backwards, or tail first, down the side of the tree to a level with the hole; and, climbing sideways, it entered. On May 18th no Starlings pitched on the short branch, the above mentioned pair having no doubt given it up as a bad job. On the 15th and 16th respectively the female Woodpecker flew from the hole after I had struck the trunk with a stick, and I concluded she had eggs there; so at 6.30 a.m. on May 17th, with the aid of a ladder, a mallet, and a chisel, I enlarged the hole, keeping it circular as much as possible, until the lad with me could put his arm in. The nest, or rather hole, contained seven fresh eggs, which I took. I may here mention that I passed immediately under these three tall trees several times daily, for the narrow keeper's path led me to a Sparrow-Hawk's nest, which I was also watching with interest.

On May 21st I noticed one of the birds again at the nesting-hole, which rather surprised me ; so I allowed her what I thought a sufficient time to deposit another clutch, which I intended to take, in order to see how many I could induce her to lay. On June 5th, at 6 a.m., I again visited the nest. The same lad mounted the ladder, and took five eggs, slightly incubated. The birds did not forsake the hole, for on June 20th one of them flew out on my approach ; so I again placed the ladder against the tree on June 28th, at 4.30 a.m. The same small lad again bared his shoulders (for length), and placed his arm in the hole ; but this time he was beaten. He could not reach the bottom of the hole. He tried again and again, but the birds had bored deeper since the last visit. I sent the boy home for the mallet and chisel, and a big lad of eighteen years. The wood was very tough, taking me over an hour to enlarge the hole sufficiently. The nest contained six eggs ; three of them were much incubated, but the other three were quite fresh and splendidly transparent, the yolks being plainly visible.

The Woodpeckers still stuck to the hole, and on July 4th both birds were about the trees. I saw and heard both birds again on July 10th ; so, after allowing them the usual interval of about three weeks, I again borrowed the ladder from the local builder, and assisted in carrying it to the wood at 7 a.m. on Friday, July 18th. As the ladder touched just beneath the hole the bird flew out, and the big lad Parker quickly brought six eggs to the bottom of the ladder, one at a time. I noticed that incubation had commenced. The female seemed greatly agitated, and flew into the tree calling loudly ; she thereby saved her eggs. The lad, by my wish, replaced each one, and we left the vicinity of the nest quickly, leaving her to bring forth her brood. This made a total of twenty-four eggs deposited by the same female in a last year's hole, eighteen of which are in my collection ; and I am sure I wish her every success with her fourth attempt. — STANLEY LEWIS (Wells, Somerset).

Breeding of the Bittern in Herts in 1849. — In the fourth edition of 'Yarrell' (vol. iv. p. 208) nests of the Bittern (*Botaurus stellaris*) are recorded from near Tring, in Herts, and near Drayton Beauchamp, in Bucks. In a footnote the editor suggests that these records relate to the same occurrence. This appears to be the case, for, from information kindly furnished by Miss Williams to Miss Harpur Crewe, I find that the nest with four eggs was taken in July, 1849, at the Wilstone Reservoirs, in Herts, about a couple of miles from Tring, and close to Drayton Beauchamp. The eggs were afterwards accidentally broken,

but were beautifully mended by John Wobley in April, 1853, as appears from the Rev. H. Harpur Crewe's note-book.—FRANCIS C. R. JOURDAIN (Clifton Vicarage, Ashburne, Derbyshire).

Breeding of the Ringed Plover in Worcestershire.—One June 1st I found a pair of these birds (*Ægialitis hiaticula*) breeding by the side of a large reservoir within ten miles of Birmingham. The young were just out of the egg, and I found three of them. This reservoir is a regular haunt of the Ringed Plover on the spring and autumn migration, but is it not very unusual to find them nesting so far inland?—D. B. GRUBB (The Croft, Barnt Green, near Birmingham).

Dusky Redshanks in Worcestershire and Warwickshire.—During my systematic rambles in this district for studying its ornithology, I was, on Sept. 15th, 1901, delighted to find *Totanus fuscus* on the muddy shore of a large sheet of water in Warwickshire. I was attracted by a note which was totally new to me, and, bringing my glasses to bear, found the specimen, which was in the immature dress. In the field this bird may be easily recognized, not only by its note, which, though bearing a family resemblance, is nevertheless quite distinct from that of *Totanus calidris*, but by the white patch across the rump, which shows up very distinctly against the wholly dark wings when the bird displays itself. A fortnight later (Sept. 29th), I saw another specimen of this bird in the winter plumage round a sheet of water in Worcestershire, about five or six miles from the Warwickshire water; and, going the same day to this latter place, I ascertained from the keeper that two more, also in winter plumage, had been seen during the week.—F. COBURN (Holloway Head, Birmingham).

Black-tailed Godwit in Ireland in Mid-winter.—On Jan. 5th, 1900, I received from Limerick a female specimen of *Limosa belgica* in full winter plumage. According to Ussher's 'Birds of Ireland' this bird is very rare in winter. I have now in my collection a fine series of this species, from the first plumage through every grade of autumn, winter, and summer—all procured at different times from Ireland.—F. COBURN (Holloway Head, Birmingham).

NOTICES OF NEW BOOKS.

The Cambridge Natural History. Vol. X. "Mammalia." By FRANK EVERS BEDDARD, M.A., F.R.S., &c. Macmillan & Co., Limited.

THERE is perhaps not so much to be said which is new on this subject, as there is on some other zoological Phyla. We have in recent years been able to read the 'Introduction to the Study of Mammals,' by Flower and Lydekker, and one of those authors has since considerably amplified his subject in the 'Royal Natural History.' Besides these publications, "Mammalia" may be said to be one of the zoological subjects now in vogue, and the monthly descriptions of new and subspecies is astounding to those who thought that the mammalian census was approximately worked out. In America the study is advancing by leaps and bounds, and when a similar enterprise is shown in other zoological regions, our present knowledge of the smaller mammals will probably be shown as quite fragmentary. Moreover, the describer of a mammal is always sure of an audience. To the uninitiated, the larger the form the greater its zoological importance, and the diagnosis of an *Okapia* will be discussed by those who are oblivious to the existence of a fresh-water Medusa. A Gorilla constitutes a more likely topic to draw a sympathetic audience at a British Association meeting than does the story of the life-history of a Nautilus, though sometimes the danger of fever is sufficient to direct a temporary public interest in so minute and humble a form of life as the Mosquito. In the work under notice, Mr. Beddard does good service in again attacking a current mammalian heresy, viz. "that ancient quadrupeds are huger than their modern representatives," in many cases the position being reversed. "The Mammalia first appeared upon the earth in a tentative and hesitating way; they had not cast off many of the characters of their supposed reptilian forefathers; they shrank from observation and destruction by their small size,

and apparently—so far, at any rate, as their teeth afford a clue—by an omnivorous diet.”

Mr. Beddard divides the Mammalia into two Sub-classes—(1) Prototheria, including the Monotremata, and possibly the Allotheria; and (2) Eutheria, embracing all the other divisions; and we are glad to see that in the Primates the Hominidæ terminate the onward or upward ascendancy of the Anthroipoidea. We may yet live to see Man more fully described in a treatise on the Mammalia, and our descendants will probably read a natural history commencing near a club-moss, and terminating with the genus *Homo*. In insisting that other animals than ourselves have neither spirit nor reason, we study their bodies only; in approaching man from a spiritual side alone, we are likely to forget that he has a body for zoological classification.

It is needless to say that this book is as handsomely illustrated as the other members of the series, and will be found as readable and useful. Mr. Beddard has not only worked hard to bring his facts up to date, but has also incorporated a notice of many current views and theories which not infrequently are “gladly heard,” but sometimes rest on an insecure basis. However, both dogma and theory appeal to a large audience, and always receive a respectful hearing; and, though our author has referred to some speculations, he has also submerged them in a sea of facts.

The Butterflies and Moths of Europe. By W. F. KIRBY, F.L.S., &c. Parts 1-7. Cassell & Co., Ltd.

WE have received the first seven parts of this publication, to which fuller reference will be made when the work is completed. It promises to prove a work of great utility to those many collectors of Lepidoptera who do not confine themselves to a purely British collection, and who remember that these islands form part of the European continental division. It is very handsomely illustrated.

EDITORIAL GLEANINGS.

WE read in a recent number of the 'Athenæum':—"Not content with his immense Shakespearian labours, Dr. Horace Howard Furness has caught the largest recorded Tarpon (246 lb.), landing his fish in thirty minutes, and returning it, like a sportsman, to the water as being inedible."

[*Tarpon atlanticus* is now a well-known fish to those anglers who can follow their craft on another continent. Jordan and Evermann gives its range as "Long Island to Brazil," and its weight as from 30 to 110 pounds ('Fishes of North and Middle America,' p. 409). Evermann and Marsh, however, in their Report on 'The Fishes of Porto Rico,' state that this fish reaches a weight of "30 to more than 300 pounds. The largest one recorded as taken on a hook weighed 209 pounds, and the largest taken with the harpoon weighed 383 pounds, if we may believe the record; but examples weighing over 100 pounds are not often seen."—ED.]

A MONTH in a lighthouse should be an experience in the life of any one, but more especially of an ornithologist, versed in and still studying the migration of birds. Mr. W. Eagle Clarke passed the time between the 18th of September and the 19th of October in the Eddystone Lighthouse, and his ornithological observations have recently been published in the 'Ibis.' It is obviously impossible to condense the information given in this paper to the dimensions of our present space, but we notice an interesting and apparently unrecorded fact, that the Herring-Gull feeds exclusively on seaweed, especially on the kind known as "sea-thongs" (*Himanthalia lorea*). The "mesmeric influence" of the light was found to exercise its greatest force on the Starling, and, after that bird, on the Sky-Lark. The prevalence of rain is evidently a matter of indifference to migratory birds, but the presence of fog has a contrary effect, though this may be largely due to the noise made by the explosions of tonite which takes place every five minutes on the lighthouse during a fog.

AN egg of the Moa was recently offered for sale at the well-known London Auction Rooms. The 'Daily Chronicle' has printed an interesting paragraph anent this egg:—

"Messrs. Arthur G. Eve and Co., Australian merchants, write to

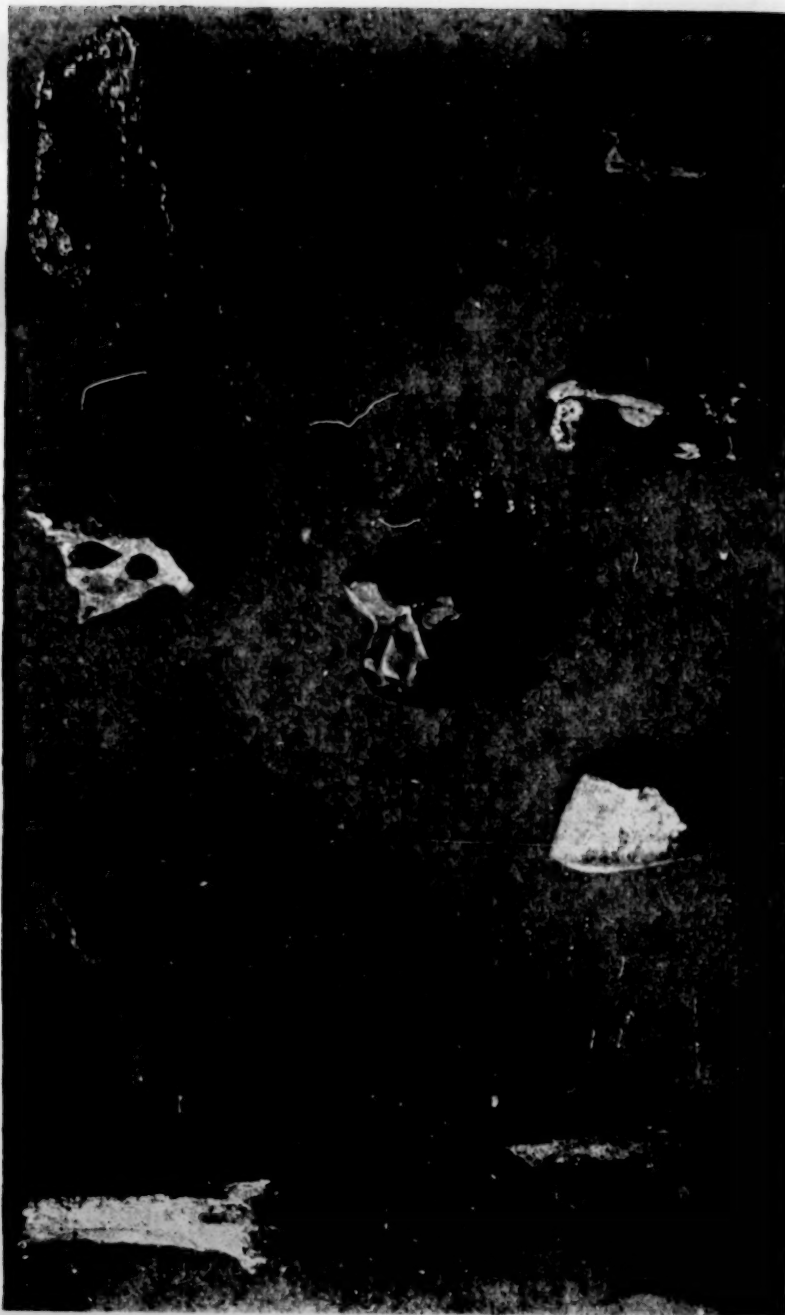
correct the statement that a Moa's egg was sold in London a few days ago for 200 guineas. That amount was bid, but, as the reserved price was not reached, the egg was not sold. Although this egg must have been lying embedded in the banks of the Molyneux River, N.Z., for some hundreds of years, it is practically perfect. The egg was found by miners, who, in carefully exploring the river bank, detected it lying on a bed of loam, probably originally exposed, but, when found, covered by river drift. There is (our correspondents say) but one other 'whole' egg of Moa in the world. There is a complete skeleton of the bird in the Melbourne Zoo, and as it stands it is about 12 ft. in height."

IN the 'Avicultural Magazine' for this month, Mr. George Carrick, in a description of a "live bird" expedition to Australia, states that in lat. $39^{\circ} 08' S.$, long. $26^{\circ} 46' E.$, 306 miles from the nearest land, and almost due south of Port Elizabeth, South Africa, a common Nightingale flew on board the steamer by which he travelled. The bird "was immediately captured and caged, and, with a plentiful supply of mealworms, he was soon quite at home, and seemed most thankful for the little kindness shown him, taking readily to artificial food." The bird was ultimately left safe and well at Melbourne.

MR. G. H. VERRALL has published a second edition of his 'List of British Diptera.' In the first List, published in 1888, 2500 species were enumerated; but of these 170 have been since expurgated, while 427 have been added, and 130 are included in the British fauna for the first time in the present edition, making a total of 2887 species; and it is considered there would be little trouble in bringing up the enumeration to 3000 species.

THE recent death of Mr. Samuel Butler, the author of 'Erewhon,' commands comment in 'The Zoologist.' He was the son of a country clergyman, and grandson of the well-known scholar and headmaster of Shrewsbury, who was afterwards Bishop of Lichfield, and was fond of telling how his grandfather had attacked Darwin's grandfather, that his father had been in controversy with Darwin's father, and he seemed to regard himself as Darwin's hereditary enemy, showing his hostility by the publication of his vindication of Lamarck.





Rolled fragments of bone from the Burmese ferruginous conglomerate.—Centre figure, tooth of Rhinoceros showing worn facets.